FILE COPY FOREST INSECT LABORATORY, UNIVERSITY OF CALIFORNIA, BERKELEY, CALIFORNIA.

647.
330 page 1

UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

FOREST INSECT INVESTIGATIONS

STATUS MOUNTAIN PINE BEETLE INFESTATION IN THE YELLOWSTONE NATIONAL PARK AND ADJACENT FORESTS

By
James C. Evenden
Entomologist

Forest Insect Laboratory
Coeur d'Alene, Idaho
April 13, 1937

U. S. GOVERNMENT PRINTING OFFICE 60918

STATUS MOUNTAIN PINE BEETLE INFESTATION IN THE YELLOWSTONE NATIONAL PARK AND ADJACENT FORESTS

INTRODUCTION

During the past twenty-five years a severe outbreak of the mountain pine beetle spread southward from the Flathead National Forest through the lodgepole pine stand of Montana until it threatened the scenic forests of the Yellowstone National Park. In a final effort to avert this threat an intensive insect survey of the Yellowstone National Park and adjacent forests was made in the fall of 1934 to determine the status of the infestation with the idea of instituting control if considered feasible. The results of this survey showed such a tremendous infestation distributed over such a large area that the institution of control was not considered as being a feasible undertaking. Though during the past two seasons there have been no systematic surveys of these areas, they have been kept under general observation by officers of the Coeur d'Alene Laboratory, and some field data have been taken. This report utilizes all available information in a brief depiction of the present status of the mountain pine beetle infestation within these areas.

UNSEASONAL LOW TEMPERATURES A FACTOR IN PRESENT STATUS OF EXISTING INFESTATION

During the winter of 1934-35 and again in the fall of 1935 extremely low unseasonal temperatures in the Northern Rocky Mountains caused a severe mortality in the overwintering mountain pine beetle

broods in lodgepole pine. The severity of this mortality varied throughout the Yellowstone infestation unit, though in all forests a variable portion of the broods was destroyed. This mortality reduced the subsequent infestation so that in many portions of the area there was very little increase and in some instances a marked reduction in the infestation. It is possible that this reduction in beetle population may have a permanent beneficial effect upon the future severity of the outbreak. On the other hand, it may be but a temporary check, and in those areas where ample host material still remains the outbreak may rebuild to its former severity.

Though extreme low temperatures were known to be responsible for abnormal mortality in overwintering broods of the mountain pine beetle, laboratory experiments have rather definitely established the fact that these insects withstand extremely severe temperatures when they occur at normal periods of the season. However, these same experiments demonstrated their lack of resistance to unseasonal temperatures, which of course are far above those which occur during normal periods.

PRESENT STATUS OF INFESTATION

For the purpose of simplifying the following statement relative to the 1936 status of the mountain pine beetle infestation, the different portions of the Yellowstone Park infestation unit will be considered separately.

Beaverhead National Forest

Though this forest is somewhat remote from the Yellowstone Park, it seems appropriate to include it in this discussion, as it constituted the greatest center of infestation from which the insects spread into those areas for which more concern has been expressed. In the Big Hole Basin of the Beaverhead National Forest the infestation has run its course, and at this time there are very few lodgepole pine being attacked by the mountain pine beetle. Needless to say, during the course of this outbreak a very large percentage of the stand has been destroyed, leaving a forest of dead trees. In the eastern portions of the old Beaverhead and in that portion of the old Madison Forest lying to the east of Dillon, which is now a part of the Beaverhead Forest, there still remains ample host material to permit the existing infestation to rebuild to a severe epidemic condition. However, within these areas there was very little increase in the 1936 infestation over that which had occurred in 1935. This condition is, as stated, attributed to an abnormal brood mortality as a result of unseasonal low temperatures in the fall of 1935. The future of the infestation in these questionable areas is uncertain, though the condition of the 1936 attacks does not indicate a marked increase for 1937.

Apparently the beneficial low temperatures had but little effect upon the overwintering broods of the mountain pine beetle in whitebark

pine, as the severity of this infestation continues. Furthermore, the general appearance of the 1936 broods would not indicate any material decreases in the severity of this infestation during the coming season. As long as these epidemics exist there will be a potential source of beetle supply for lodgepole infestations.

Gallatin National Forest

With the exception of the Tobacco Root Mountains, which are a part of three forests, namely, Gallatin, Beaverhead, and Deerlodge, and within the Cherry Creek ranger district, the infestation of the mountain pine beetle in lodgepole pine on the Gallatin Forest has never reached an epidemic status comparable to the Beaverhead situation. There were, however, several small spots of severe infestation within this forest which undoubtedly would have developed to severe epidemic conditions had not the broods been materially reduced by the previously mentioned unseasonal temperatures. On the Gallatin Forest there has not been a severe loss of lodgepole pine, and the development of severe epidemics is still entirely possible. At the present time a light infestation exists in most lodgepole pine stands, though its future is uncertain. The infestation in whitebark pine continues with the same degree of severity, and in some areas a large percentage of the stand has already been destroyed.

Absaroka National Forest

Though no records are available of an infestation of the mountain

pine beetle in the scattered lodgepole pine stands of the Absaroka National Forest, the infestation in whitebark pine is reported as continuing in its previous severity and spreading into uninfested areas. One may be assured of the destruction of a large percentage of this timber type during the course of this infestation.

Targhee National Forest

The history of the infestation on the Targhee National Forest is a matter of record. It was first recorded in 1927, and control measures conducted each year on an increasing scale up to 1931, when the outbreak reached such a magnitude that further control was considered as being an uneconomical procedure. Following the cessation of control the epidemic continued to increase in severity, and in many portions of the forest a major part of the lodgepole stands has been destroyed. During the past two years unseasonal temperatures or other environmental factors reduced the severity of this infestation to a point where data from a permanent sample strip on the Antelope Flats showed a reduction of 47 percent in last year's losses. There remains, however, a potentially serious situation, with ample host material remaining in some areas to permit the development of a severe epidemic.

Yellowstone National Park

Though for the past six years there has been a severe epidemic of the mountain pine beetle in all whitebark pine areas of the park,

there has been no general infestation of this insect in the lodgepole pine stands. Though the losses of lodgepole pine have not been severe, in areas where this species is associated with whitebark pine the 1936 attacks were rather equally distributed between these two tree species. Furthermore, during the past two seasons there has been an increase in the occurrence of mountain pine beetle attacks in lodgepole pine stands remote from areas of infested whitebark pine. This infestation first appeared in association with other insects as scattered individual attacks in decadent trees around resorts, geyser formations, camp grounds, and so forth. In 1935 small spots of rather heavily infested trees appeared in some areas, which indicated the occurrence of a more general infestation of the mountain pine beetle in lodgepole pine than had previously existed. An examination of these trees during the 1936 season showed that there had been practically a 100 percent mortality of the overwintering broods, which is assumed to be the result of abnormal temperatures in the fall of 1935. As a result of this natural control the existing infestation in lodgepole pine was practically eliminated. What occurred during the season of 1936 relative to new attacks in lodgepole coming from the whitebark pine areas or adjacent forests is not known but will be ascertained by an extensive examination of the park during the coming season. Though at the present time there is no serious infestation in the scenic lodgepole pine stands of the Yellowstone National Park, the whitebark pine infestation constitutes

a potential source of subsequent infestations. In some of the white-bark pine areas a large portion of the stand has already been destroyed.

Teton National Forest and Grand Teton National Park

Though very little information is available relative to the status of the 1935 and 1936 infestations within the Teton National Forest, data were secured from the Grand Teton National Park, which lies within the Teton National Forest. These data show that on the Grand Teton Park the 1936 infestation averaged 4.5 infested lodgepole pine per acre, and it is believed that this serious condition is representative of conditions throughout the Teton National Forest. Though predictions are difficult, existing conditions indicate an increase in the severity of the 1937 infestation throughout this area.

The infestation within the whitebark pine stand of this forest maintains its epidemic status, with severe annual losses of this tree species. The extent to which this infestation will contribute to subsequent outbreaks in adjacent lodgepole stands is unknown, though it is believed to have occurred in the past and will undoubtedly continue to do so.

Shoshone National Forest

In the lodgepole pine stands of the Shoshone National Forest adjacent to the east boundary of the Yellowstone National Park there has been a rather substantial increase in the severity of the mountain pine beetle infestation during the past season. Though a serious

condition does not exist at this time, its potentials are appreciated. There is as in other areas a severe infestation of the mountain pine beetle in all whitebark pine stands, which undoubtedly is responsible for the infestations in lodgepole pine.

CONCLUSIONS

Though this statement is not based upon a great amount of actual data, it does depict the 1936 status of the mountain pine beetle within the Yellowstone Park infestation unit. A more detailed description of this general situation would have required the execution of intensive surveys, which would not be justified by this objective. These areas will be kept under general observation and subsequent status reports submitted.